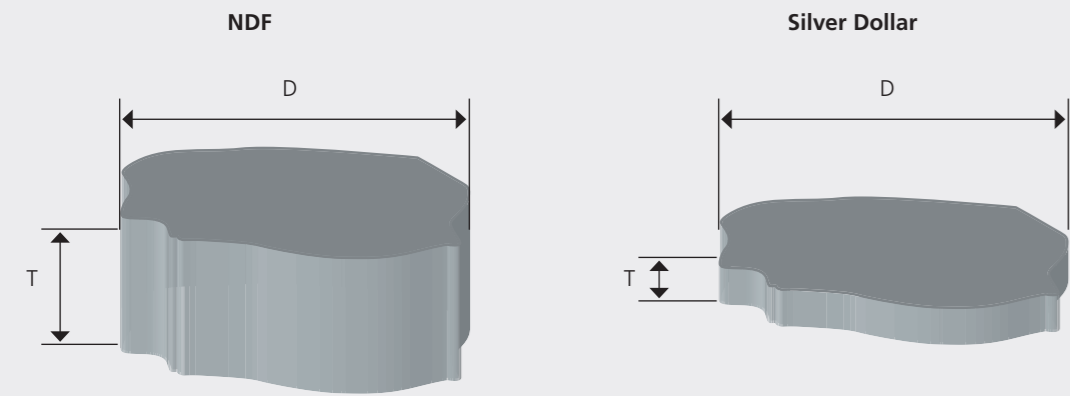


NDF – Non-Degrading Flakes

Pigment Characteristics / Morphologies (Aspect Ratio)

- NDF's pigments provide improved shear stability due to increased thickness and edge uniformity.
- Improved shear stability means the pigment will not lose brightness and flop during high stress applications, e.g. in automotive recirculation systems / coil applications.

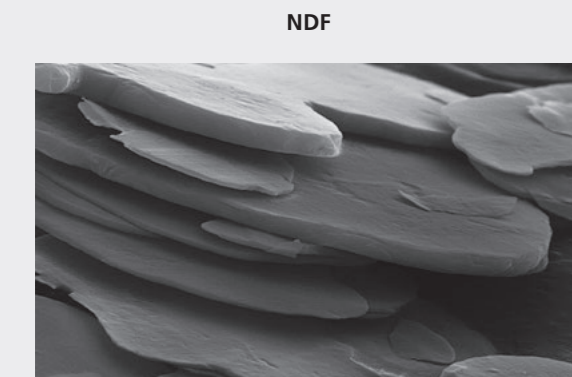
Aspect Ratio



Better shear stability

Better Coverage and Hiding power

SEM pictures:



ECKART GmbH
Guenthersthal 4
91235 Hartenstein, Germany
Tel +49 9152 77-0
Fax +49 9152 77-7008
info.eckart@altana.com
www.eckart.net

With compliments

ECKART America Corporation
830 East Erie Street
Painesville, Ohio 44077, USA
Tel +1440 954-7600
Fax +1440 354-6224
Toll-free: 800-556-1111
info.eckart.america.oh@altana.com
www.eckart.net

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NDF

Non-Degrading Flakes

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NDF – Non-Degrading Flakes

Description & General Information

- NDF pigments are designed specifically to provide increased shear stability versus traditional Cornflake and Silver Dollar flakes while providing excellent brightness, flop, sparkle and color stability.
- NDF pigments are suitable for conventional paint systems. On request and based on the application, we can offer stabilized pigments for water-based systems.
- NDF's are more stable in circulation systems than conventional Aluminum pigments.
- NDF's are thicker than traditional silver dollar and cornflake pigments.
- NDF's come in a wide variety of particle sizes (D50 of 12 µm up to 34 µm) and are supplied in paste form.
- ECKART America has almost 20 years of experience in manufacturing NDF pigments.

Application Areas

- NDF's are used for a wide field of applications, such as:
- Automotive OEM & Accessories
 - Coil coatings
 - Wheel rims
 - Packaging - exterior and interior food can coatings
 - Graphic Arts applications - flexographic and gravure printing

Conventional Flake

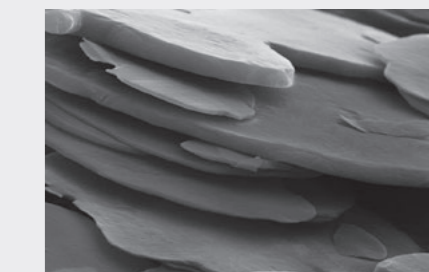


SEM

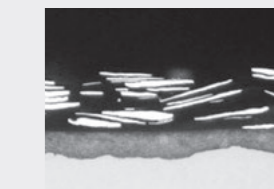


cross section polish

NDF



SEM



cross section polish

NDF – Non-Degrading Flakes

Shear Stability

Shear Stability is described as the property of a pigment flake to retain structure, color, brightness and flop when exposed to a high shear situation.

When pigments are exposed to high shear forces, such as in paint recirculation systems, they can experience physical damage to the flake perimeter, and in worst cases actual fractures to the flakes. This damage will result in an appearance change which is normally observed as a decrease in color, brightness and flop.

Shear stability is a concern in the Automotive and Coil Coatings Industries, and other applications where liquid paint is exposed to high shear.

Shear Stability is influenced by several factors:

- Pigment Structure / Morphology
- Paint System – high solids vs. low solids and solventborne vs. waterborne
- Application System – Pumps, paint recirculation, roller applicator, high speed 'bell' cup

In order to determine pigment stability properties, Laboratory Test Methods are used to simulate the shear in Automotive OEM paint recirculation systems, e.g., Waring Blender Test.

NDF pigments offer the solution: Superior shear stability, unique color position with excellent brightness, color stability and flop:

Comparison Silver Dollar – NDF in coating: Shear stability

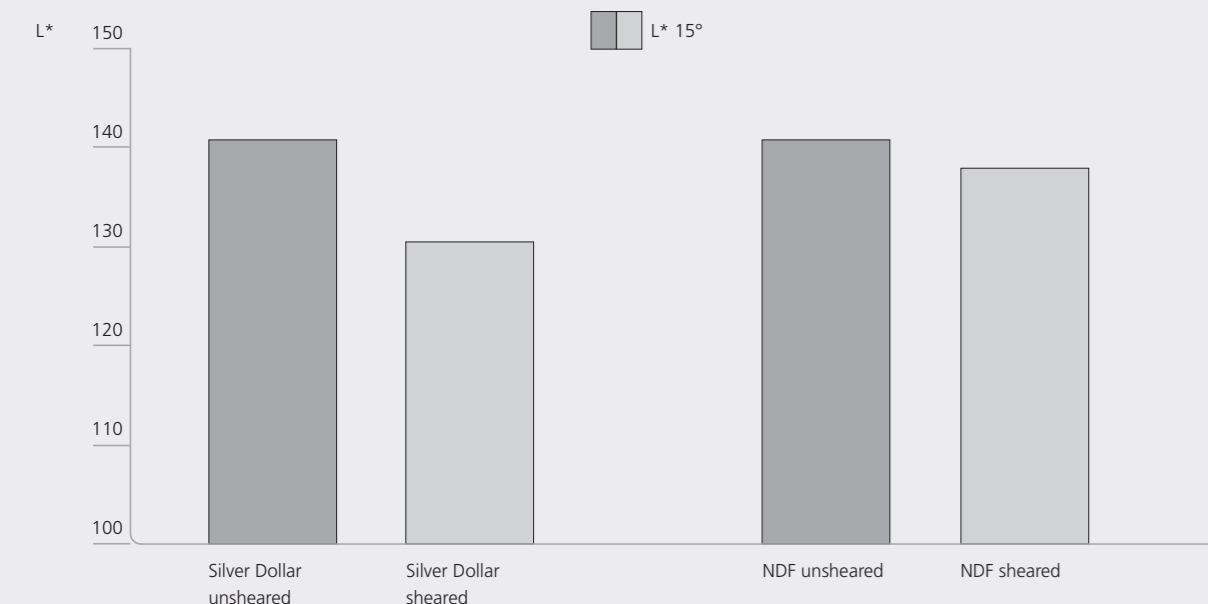


Illustration after Waring Blender test: Deviation in L* (15°) between "unsheared" and "sheared" paint application. Measured with Spectrophotometer (e.g. BYK-mac).

NDF

NDF – Standard Product Portfolio

NDF	Visual effect	D10	D50	D90	NVM	Shear
NDF 120	fine	6	12	20	70	semi
NDF 130	medium – fine	6	13	23	70	semi
NDF 150	medium	8	15	24	70	semi
NDF 165	medium	8	17	30	80	non
NDF 170	medium	9	17	29	80	non
NDF 200	medium	11	20	30	80	non
NDF 340	coarse	17	34	56	83	semi



NDF 2000

NDF 3000

NDF 2000 – Enhanced Product Portfolio

- Brighter metallic effect
- Increased flop / travel
- Comparable tint strength (to Standard Product Portfolio)

NDF	Visual effect	D10	D50	D90	NVM	Shear
NDF 2120	fine	7	12	20	70	semi
NDF 2140	medium – fine	9	14	22	70	non
NDF 2180	medium	11	19	30	75	non

NDF 3000 – Premium Product Portfolio

- Narrowed particle size distribution
- Brighter metallic effect
- Increased flop / travel
- Higher color purity
- Comparable tint strength (to Standard Product Portfolio)

NDF	Visual effect	D10	D50	D90	NVM	Shear
NDF 3125	fine	8	13	20	70	non
NDF 3150	medium – fine	10	16	24	75	non
NDF 3250	medium – coarse	14	25	45	83	semi

NDF – Non-Degrading Flakes

Particle size distribution

